

ACCESSION #: 9811200298

NON-PUBLIC?: N

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Harris Nuclear Plant, Unit 1 PAGE: 1 OF 3

DOCKET NUMBER: 05000400

TITLE: Turbine control anomaly causes a manual reactor trip

EVENT DATE: 10/23/1998 LER #: 1998-007-00 REPORT DATE: 11/17/1998

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 094

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Mark Ellington, Senior Analyst - TELEPHONE: (919) 362-2057

Licensing

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE TO EPIX:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 19:28 on October 23, 1998, the control room staff commenced a planned shutdown of the unit, from 100% power, for entry into a refueling outage. All four Governor Valves (GVs) on the unit's High Pressure Turbine unexpectedly went full open while the unit was at approximately 85% power. Indicated power increased to approximately 94% prior to the unit being manually tripped by the operators.

All turbine control manipulations were performed as required by the operating procedure

and in accordance with all written vendor recommendations; however, some unofficial, verbal vendor recommendations regarding transfers from MANUAL control to OPER AUTO control were not performed. It is believed that these recommendations may have resulted in a successful transfer from TURBINE MANUAL to OPER AUTO control of the Digital Electro-Hydraulic (DEH) system. Therefore, the root cause of this event was a failure to incorporate verbal vendor guidance into operating procedures. This additional vendor guidance will be verified and added to applicable procedures, as well as performing diagnostic testing of the DEH system, prior to the next turbine startup.

The Harris Nuclear Plant uses a Westinghouse P2000, MOD1 type DEH computer.

TEXT PAGE 2 OF 3

I. DESCRIPTION OF EVENT

At 19:28 on October 23, 1998, the control room staff commenced a planned shutdown of the unit for entry into a refueling outage. Turbine load was initially at 100% and was being reduced in the TURBINE MANUAL mode because the control system (EHS: TG, DCC) had unexpectedly transferred to this mode a month earlier, due to power supply problems. The Harris Nuclear Plant uses a Westinghouse P2000, MOD1 type DEH computer. The plan was to decrease turbine load below 90%, then transfer to the OPER AUTO mode of control (i.e., automatic turbine load decrease based on operator entered settings). Currently the operating procedures do not allow the transfer above 90% due to the anticipated load swings during the transfer. The OPER AUTO mode was desired to minimize the burden on the control room staff during the remainder of the shutdown. The power decrease to approximately 85% power (780 MW on the DEH digital displays) using TURBINE MANUAL occurred without problems. Power was held at this point for the transfer to OPER AUTO. At that time, governor valve positions were as follows: GV-1 shut, GV-2, 3, & 4 approximately 40% open.

A licensed operator commenced the transfer by depressing the SINGLE, OPER AUTO, and IMP IN (first stage impulse pressure feedback loop) push-buttons.

The transfer took approximately 19 minutes, as the valves moved from SEQUENTIAL to SINGLE mode positions. The unit experienced minor load swings of up to 20 MWe, which are normal during such a transfer. At the completion of the transfer, all four valves indicated approximately 25 percent open.

With normal indications of OPER AUTO in SINGLE valve control, the licensed operators initiated another power decrease by selecting MW IN (megawatt feedback loop), entering a target value of 120 MW at 5 MW/minute, and depressing the GO push-button. The operator verified that the digital display in the REFERENCE window was lowering; however, subsequent reviews of chart recorders and computer archive data show that the governor valves never started moving closed. Approximately two minutes after the operator depressed the GO push-button, the operators observed outward automatic rod motion, the receipt of the TURBINE AUTOMATIC LOADING STOP annunciator (i.e., the C-16 interlock), all four GVs indicating full open by their split lens position indications, and reactor power steadily increasing.

Upon confirmation, the shift supervisor decided to manually trip the unit.

The trip occurred at 20:39 hours with an expected automatic start of all three auxiliary feedwater pumps (i.e., ESF actuation), due to the shrinking steam generator water levels. The reactor trip recovery proceeded normally with minor equipment deficiencies noted on some non-safety secondary

systems.

II. CAUSE OF EVENT

The root cause for this event is a failure to incorporate verbal vendor guidance into operating procedures. Specifically, the failure to incorporate vendor guidance previously provided (in 1992; see section V for additional details) by the vendor through phone calls and E-mail regarding the need for additional control manipulations when transferring control from TURBINE MANUAL to OPER AUTO control.

One aspect of the new vendor guidance deals with 'zeroing' the 'governor valve common signal' prior to transferring from TURBINE MANUAL to OPER AUTO. The second recommendation calls for the following manipulations when transferring: 1) ensuring the IMP and MW feedback loops are out of service; 2) depressing the OPER AUTO push-button and placing the IMP feedback loop in service about 15 seconds after the transfer to OPER AUTO begins; 3) once the transfer is complete, removing the IMP feedback loop from service; 4) making a 1 MW change at 1 MW/min; and 5) placing the IMP and MW feedback loops in service. Thus far, no specific reason has been identified as to why the DEH system becomes unstable following a mode control transfer.

TEXT PAGE 3 OF 3

III. SAFETY SIGNIFICANCE

There were no actual safety consequences as a result of this event. All systems required to limit an excessive steam demand, as enumerated in FSAR sections 15.1.3 through 15.1.5, remained operable throughout the event.

Additional features available to protect the unit from an overpower condition are reactor trips and rod stops/runbacks, such as Power Range Nuclear Instrument High Flux, Over Power Delta-T, and Over Temperature Delta-T. These features remained available, and were not challenged due to conservative, intervening operator action. No safety limits were exceeded and the event neither initiated nor exacerbated any radiological releases. This report is being submitted pursuant to the criteria of 10CFR50.73(a)(2)(iv) for an unplanned manual actuation of the Reactor Protection System (RPS) and the unplanned, automatic Engineered Safety Features (ESF) actuation of all three of the auxiliary feedwater pumps (e.g., Motor Driven and Turbine Driven AFW Pump starts on low-low steam generator levels).

IV. CORRECTIVE ACTIONS

1. Incorporate the additional control manipulations needed when transferring from TURBINE MANUAL to OPER AUTO control into the applicable procedures prior to the next turbine startup.
2. Perform diagnostic testing of the DEH system prior to the next turbine startup.

V. SIMILAR EVENTS

Two similar events occurred at Harris involving the unwanted opening of all four governor valves; one event occurred in 1988 and the other in 1992.

Both of these events were terminated by the operators taking TURBINE MANUAL control and restoring valve positions to normal (i.e., neither event

resulted in a unit trip). Neither event resulted in the generation of an LER because no reactor trip or ESF actuation occurred.

The 1988 event involved restoration of the DEH computer following a complete loss of power to it. Subsequent investigation by the vendor revealed and corrected minor problems with control cards.

The 1992 event was very similar to the subject event in that the unit load was being decreased after transferring from SEQUENTIAL to SINGLE valve control while in OPER AUTO. The transfer to SINGLE was uneventful; however, all four GVs went full open approximately two minutes into the subsequent downpower. Following this event, the vendor provided verbal guidance regarding additional control manipulations needed to minimize the possibility of an unexpected opening of the governor valves. These recommendations were evaluated in 1992, but were not incorporated into the operating procedures because the recommendations were unofficial (i.e., not included in the vendor manual) and the approved guidance had been successful during numerous transfers.

ATTACHMENT 1 TO 9811200298 PAGE 1 OF 1 ATTACHMENT 1 TO 9811200298
PAGE 1 OF 1

CP&L

Carolina Power & Light Company

Harris Nuclear Plant

P.O. Box 165

New Hill NC 27562

NOV 17 1998

U.S. Nuclear Regulatory Commission Serial: HNP-98-170

ATTN: NRC Document Control Desk 10CFR50.73

Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1

DOCKET NO. 50-400

LICENSE NO. NPF-63

LICENSEE EVENT REPORT 1998-007-00

Sir or Madam:

In accordance with 10CFR50.73, the enclosed Licensee Event Report is submitted. This LER describes a manual reactor trip following an unexpected opening of the Main Turbine Governor Valves.

Sincerely,

B.H. Clark

General Manager

Harris Plant

CWF

Enclosure

c: Mr. J. B. Brady (HNP Senior NRC Resident)

Mr. L. A. Reyes (NRC Regional Administrator, Region II)

Mr. S. C. Flanders (NRC - NRR Project Manager)

5413 Shearon Harris Road New Hill NC

*** END OF DOCUMENT ***
